

**Central Valley Salmonid Satellite Project Work Team:  
Juvenile Monitoring**

Final Meeting Notes from October 25, 2007  
DWR Building, Sacramento CA 10:30

Participants: Bill Poytress (Chair; USFWS), Erin Chappell (CDWR), Doug Threlhoff (USFWS), Felipe Carrillo (USFWS), Dennis Blakeman (CDFG), Richard Corwin (USBOR), Robyn Bilski (CDWR), Katherine Weaver (CDWR), Kellie Whitton (USFWS), Ryon Kurth (CDWR), John Williams, Jason Shillam (EBMUD), Ayesha Gray (Cramer Inc.), Clark Watry (Cramer Inc.), Bruce MacFarlane (NOAA), and Brad Cavallo (Cramer Inc.).

**I. Introductions and Announcements:**

Welcome newest participants Ayesha Gray and Clark Watry of Cramer Fish Sciences (Lower Stanislaus River project) and Robyn Bilski and Katherine Weaver of the CDWR (Feather River project).

**II. Modify/Adopt Agenda:** No modifications.

**III. Approve/Amend 5/17/07 Draft meeting Notes:** Chair has one discrepancy to resolve, final notes to be emailed out and posted to website in the coming weeks.

**IV. Group Discussion: *Juvenile Monitoring Updates***

**B. Poytress:** Seven day a week rotary trap sampling is funded and scheduled to occur during the fall and winter season. Mark-recapture trials will be conducted when possible to add additional points to the trap efficiency model. Winter run catch has been predictably low with respect to the relatively low numbers of adults returning to the upper river this past summer. Catch of winter run is currently about 20% of last year at this time (22,000 vs 100,000).

**J. Shillam:** Rotary trap sampling is planned to commence below the Woodbridge dam beginning in December. Wild stock coded wire tagging of fall run is also scheduled to occur, similar to previous years. A second trapping location near Lockeford is also being considered. One redd has been found on the Mokelumne from this years first redd survey.

**A. Gray:** Juvenile monitoring is planned to occur on the Stanislaus (Caswell Site) and on the Merced (Hatfield State Park). Disease issues reported last year (*columnaris*) will be investigated further this year and more information to be presented later during this meeting. Coded-wire tagging will also occur again this year on the Stanislaus through the use of a second trap capturing fish for this purpose primarily. For the 2007 season 800 juvenile salmon were tagged from the Stanislaus and 190 from the Merced. Three recoveries were documented, two at Mossdale trawl and one at the Central Valley Project (federal) South Delta pumping facility.

**R. Corwin:** Red Bluff Diversion Dam is still conducting entrainment studies at the research pumping plant which is currently having water demands resulting in the operation of 3 of 4 pumps. Elastomer tagging of Coho on the Trinity River is being conducted to evaluate restoration activities. Fish are being captured by minnow traps using salmon roe. From this study it appears that Coho are only being found in the two restoration sites and not in either of two control sites.

**K Whitton:** The Battle Creek (BC) juvenile monitoring project has recently completed 6 annual reports and they are currently available for download at the following website: <http://www.fws.gov/redbluff/cvpia.html> For the upcoming season one rotary trap placed above the BC barrier weir will be deployed in the coming weeks. Paired releases of hatchery and wild fish are planned to take place this coming season to evaluate the use of hatchery fish as surrogates to conduct efficiency studies throughout the sample period.

For Clear Creek (CC), several juvenile monitoring reports are nearing completion. FWS plans to reinstall two rotary traps in the upper and lower watershed similar to previous years. Date of redeployment will be dependent upon temperature modeling efforts.

**D. Threlhoff:** The Comprehensive Assessment and Monitoring Program's (CAMP) focus is to consolidate data/information from individual monitoring projects (adult and juvenile). The focus has recently been on adult information and a recent 15 year compendium report is now under review by various Fishery managers. The current CAMP focus is going to be shifted towards juvenile fishery information. Doug and the JMPWT chair will work on preparing a meeting to discuss some important aspects of juvenile monitoring including utility of data derived from various projects. The CAMP website has been revamped and can be found at: <http://www.fws.gov/sacramento/CAMP/index.htm>

**R. Bilski:** Two rotary traps will be sampled on the Feather River with wild stock coded wire tagging to occur again at the low flow channel (RM 61). A third trap may be deployed at RM 46.

**E. Chappell:** FWS-Stockton Update via P. Brandes: Chipps Island trawl resumed as of October 1. Sampling was discontinued in May due to concerns about take of Delta Smelt. Funding has been secured for 7 day a week sampling but may be reduced because of Delta Smelt concerns. DNA sampling, funded through CALFED, of winter and spring Chinook will be conducted for the next three seasons beginning this year. Delta Action 8 experiments are slated to occur using CWT and acoustic tags. The acoustic tagged fish will be released at Sacramento and Georgiana Slough this year. The plan is to have a December release of fish with the Delta Cross Channel gates open and one in January with the gates closed. CWT fish releases will occur at Port Chicago, Ryde and Georgiana Slough.

South Delta pumping facilities: Salmon are not currently being detected at the facilities in a pattern similar to previous years. Data Assessment Team (DAT) calls are occurring every other week for the time being. Remedies will be implemented this year in response to court orders to change pumping operations; details to be worked out. Environmental Water Account biologists have changed the Salmon Decision Tree. The new tree can be found at

the CALFED Operations website under 2008 Operations “Salmon Decision Process”:  
<http://www.woco.water.ca.gov/calfedops/2008ops.html>

**V. Group Discussion Topic: Recent Science magazine article *Genetic Effects of Captive Breeding Cause a Rapid, Cumulative Fitness Decline in the Wild* (Araki et al 2007) with overview presentation and discussion led by John Williams.**

**John** began discussing the paper by providing some introductory information about the Hood River system as it related to the article (location map and sample design). The results of the study indicated that Relative Reproductive Success (RRS) in the wild of hatchery Steelhead with one hatchery fish parent, relative to hatchery fish with two wild parents was ~55%. The results show an immediate response by hatchery reared Steelhead mated with each other within a generation. John showed a figure indicating further substantial reductions in RRS with each successive generation. It appears that the egg to smolt survival period is critical as it relates to the probability of success of future generations produced in the wild (i.e. hatchery practices intended to increase survival rate of juveniles to adulthood have significant detrimental effects on subsequent generations when hatchery reared juveniles are allowed to spawn in the wild as adults). Moreover, if this concept is related to Sacramento River Fall Chinook it appears that hatchery reared fish are making up a greater contribution of the in river escapement which has had an overall negative effect on the total escapement levels seen in the river in the past four decades (i.e. Battle Creek hatchery fish are resulting in reduced fitness of Sacramento River Fall Chinook as a whole similar to the results seen by the Araki et al study).

When asked about what steps should be taken to ameliorate these effects, John noted that the mechanisms by which this occurs need to be studied and understood. In this way, action could be taken to mitigate for the effect of reduced fitness of the species.

**VI. Featured Discussion Topic Juvenile Fish Physiology and Health**

**A. Presentation by Bruce MacFarlane (NOAA): *The Energetics of Estuarine Emigration and Early Ocean Life in Juvenile Chinook Salmon.***

**Bruce** began juvenile Chinook studies in the San Francisco Estuary back in 1995 as Central Valley stocks were being listed under the ESA. For the purpose of this presentation, the estuary is defined as the saline portion of the Bay-Delta. Some of the objectives of the study were to determine juvenile Chinook salmon energy dynamics at the point of entry into the Estuary through their first several months in the ocean. To accomplish this, sampling of juvenile Chinook was performed at four sites within the Estuary (RKM 3, 26, 46, 68 [being Chipps Island]). In the Pacific ocean, samples were derived from several stations ranging from Pt. San Pedro in the South to Pt. Arena to the North. Within the Estuary, HydroLabs were deployed to obtain information on water quality parameters. Plankton net sampling was conducted as well. Pt. San Pedro was determined to be the southern extent of ocean sampling since only 3 juveniles were found south of this area. Sampling in the ocean

occurred June and July, September and October and during some winters (conditions and equipment permitting). Numerous types of data were taken from the juvenile fish samples including [did not record all in notes] length, weight, otoliths, energy storage (triacylglycerols; TAG), total proteins and lipids, lesser lipids (cholesterol) and others. The results were many and only the overall conclusions were recorded in these notes. The summary of conclusions is as follows:

**“Juvenile Chinook Salmon Energy Dynamics:**

- Little or no growth gain in energy content while in estuary
- Accelerated growth, TAG catabolism, lower condition during first month in ocean
- Fish regain TAG and condition during summer to fall (in ocean)
- Greatest rate of energy accumulation occurs during the first month in ocean; rate declines through fall and winter
- By the end of first winter, juvenile Chinook contained ~1000 KJ of energy
  - 80% of energy is protein
  - 65% of lipid energy is TAG
- In estuary energy accumulation [principal component analysis]
  - related to plankton biomass
  - inversely related to outflow and juvenile salmon abundance
- In ocean, energy status [principal component analysis]
  - related to upwelling intensity (May – September)
  - inversely related to sea level height and juvenile abundance (May –September)”

**B. Presentation by Ayesha Gray (Cramer FS): *Tracking and Marking Juvenile Chinook Salmon Emigrants on the Stanislaus River and Finding Evidence of Columnaris.***

Ayesha presented information regarding the lower Stanislaus river rotary trapping operation and a juvenile outmigrant coded wire tagging project conducted in 2007. In summary, Cramer Fish Sciences operates a rotary trap at the Caswell Park sampling site whereby they A). estimate juvenile Chinook abundance via passage estimates using a model to calculate trap efficiency, B). estimate in-river survival from the Oakdale sampling site (upper river site) to Caswell (lower river site), C). evaluate patterns of out-migration timing, and D). Relate flow and other environmental conditions to abundance and timing. Results of this sampling indicate that survival between sites is lower in “dry” years and early spring is the time fry generally pass and later spring smolts pass. Further, in “wet” years fry make it to Caswell, but in “dry” years they do not [or are not detected?].

To answer the question,” What is the contribution rate of fry/parr/smolt outmigrants to the returning adult population on the Stanislaus River?” Cramer Fish Sciences used coded wire tags to mark juvenile salmon. Additional information to be acquired with the study included, ”What inferences about survival, growth and migration timing for juvenile

Chinook can be determined from tag recoveries?” and “What inferences about contribution to ocean fisheries can be determined?” In order to increase their sample size (i.e. number of fish tagged and released into the wild), they opted to operate a second 8 foot rotary trap. Additionally, they constructed a mobile lab for on-site tagging, consulted with Jerry BigEagle for tagging operations, and acquired the skills needed to tag juvenile Chinook caught by rotary traps.

To summarize the 2007 season, 800 fish were tagged, but they found mortality was very high after a 24 hour holding period. The fish appeared to be in poor condition and signs included loss of equilibrium. Some fish were sent to Scott Footte, of the California-Nevada Fish Health Center in Northern California for analysis. From his analysis, Scott diagnosed the fish as having an elevated level of columnaris. Ayesha noted that this is a common bacteria that overgrow under certain environmental conditions (e.g. high water temperature, low oxygen, high nitrite, high ammonia concentrations). After determining high water temperature or low DO was unlikely, it appeared that other water quality parameters may be of issue.

Therefore in 2008 they propose “To determine the prevalence of Columnaris and other disease agents in juvenile Chinook salmon from the Stanislaus River”. To do this the group will:

- 1). “Assess fish caught in traps for obvious clinical signs of disease (overt changes to gill and skin) and tissue imprint from moribund fish.”
- 2). “Perform histological evaluation of selected tissue (gill, liver, kidney) from randomly selected individuals throughout the sample period.”
- 3). “Perform two on-site visits to perform blood assays (differential counts, HCT, plasma protein and chloride) and examine fish for viral and bacterial infections.”

From this presentation some miscellaneous discussion points were made:

- \* Ayesha noted that if one fish is found in a rotary trap with columnaris, all others are likely infected.
- \*There is no known data of this kind from the upstream sampling location at Oakdale conducted by Fish Bio consultants.
- \*This type of issue may have been looked into at the American River (Kjelson or Casteleberry papers?).
- \*The limited data may suggest an overload of nitrogenous waste in the water course if temperatures and DO are not contributing to poor water quality conditions. This would seem consistent with the various operations ongoing in the watershed (e.g. operation of dairies or other livestock ventures possibly contributing waste to the river).
- \*Members of the group suggested raising the issue with the California State Regional Water Quality Control Board as they have jurisdiction over water quality issues. They should be consulted to be made aware and could then be contacted upon specific instances when fish mortality or disease prevalence occurs. In this way, someone will be familiar with the issue prior to an outbreak.

**VI. Next Meeting Date and Topic:**

Tentative date set for Thursday January 24<sup>th</sup> proposed at YBWA.

The topic to be developed in the coming weeks concerns the revisiting of rotary trap sampling: evaluation of methods and results to determine most appropriate uses of data acquired from this sampling activity (i.e. evaluate restoration actions etc...). A final comment by J. Williams is that Noble Hendrik(?) will be developing a population model for Central Valley salmonids. Juvenile data collected by this group could be a possible data input for this project. Announcements related to this endeavor will be forwarded on to the group as they are acquired.